REMARKS

Claims 56 and 57 are canceled without prejudice. New Claims 62 and 63 are added and Claims 53 and 58 are presented in amended form. Thus, by this Amendment, Claims 32 through 38, 41 through 46, 53 through 55 and 58 through 63 are presented for examination.

The Examiner has allowed Claims 32 through 38 and 41 through 46. Claims 53, 54, 56, 59 and 61 are rejected as allegedly rendered obvious by the United States patent of Khoury, et al. in view of those of Schweikert et al. and Schaeffer. Claim 55 is rejected as allegedly rendered obvious by the preceding combination of references further in view of the United States patent of Roza while Claim 60 is rejected as allegedly rendered obvious by such combination further in view of the United States patent of Koslov et al. For the reasons set forth below, in view of the changes made to the claims herein, it shall be apparent that all presently pending claims of this application define patentable subject matter.

Independent Claim 53 (previously rejected) has been amended to incorporate the limitations of dependent Claims 56 (previously rejected) and 57 (previously objected to solely for dependence on a rejected base claim). By such amendment, Claim

53 now overcomes the Examiner's pending rejections of this claim as well as those of Claims 54, 55, and 59 through 61 that depend from the amended Claim 53. Claim 58 (previously objected to for dependence upon a rejected base claim) has been amended to refer to allowable amended Claim 53.

As the pending rejections of Claims 53 through 56 and 59 through 61, as well as objections to Claims 57 and 58 are overcome by amendment, and pending Claims 32 through 38 and 41 through 46 have been indicated to define patentable subject matter by the Examiner, her attention is now directed to new Claims 62 and 63.

New Claim 62 is directed to a rotation rate sensor of the type that comprises a drive circuit and a micromechanical resonator, wherein the drive circuit includes at least one pulse modulator for conversion of a complex input signal to a pulsed signal for application to the resonator. This apparatus claim parallels language of allowed Claim 32 while being directed to a rotation rate sensor. Support for this definition of the invention is found in the substitute specification at page 16, lines 1 through 6 ("Resonators that can oscillate in two mutually perpendicular directions y_1 and y_2 are employed in rotational rate sensors and Coriolis gyros. The two-dimensional pulse

modulator illustrated in Figure 9 may be employed for electrostatic stimulation of a two degree of freedom resonator.")

New Claim 63 is directed to a method for operating a rotation rate sensor of the type in which a micromechanical resonator is driven using pulse modulation of a complex input signal. This method claim parallels language of allowable (as amended) Claim 53 while being directed to a method for operating a rotation rate sensor. Again, the relationship of the defined method to a rotation rate sensor is supported by the language of the substitute specification.

While Claims 62 and 63 present new definitions of the invention, Applicant offers the following remarks in support of the patentability of each in view of prior art already cited by the Examiner in relation to previously pending claims.

Claim 53, as previously presented, was rejected as allegedly rendered obvious by Khoury et al. in view of Schweickert et al. and Shaeffer, the Examiner noting that Khoury et al. fails to disclose that the pulse signal produced by a pulse modulator is used for electrostatic oscillation stimulation of a resonator. Further, the Examiner alleges that the Shaeffer reference discloses, in Figure 2 or 3, a pulse modulator with an

outputting signal 214 employed for electrostatic stimulation of a resonator filter 208.

However, Schaeffer describes, with reference to Figure 2, that the resonator 208 outputs a commutated signal 228 and a sampling circuit 210 samples (quantizes) this conditioned and commutated signal 228. See col. 3, lines 7 through 10 of Shaeffer. Shaeffer also shows (see Figure 2) a quantization stage 210 whose input signal comes from a resonator. This is in contrast to the language of new Claim 62 in which an output signal is applied to a resonator. ("a quantization stage, which quantizes at least one of the real part and imaginary part of the control signal which has been up-mixed by ω_0 and thus produces the pulsed signal, with the pulsed signal which is produced by the at least one pulse modulator and which is used for electrostatic oscillation stimulation of the micromechanical resonator, and with the pulse modulator being operated at a sampling frequency ω_A which is 2 to 1000 times higher than the mixing frequency $\omega_{0"}$. Claim 62, emphasis added.) In contrast, according to Figure 2 of Shaeffer, resonator output is transmitted to a quantization stage.

The Examiner has also previously characterized Shaeffer as disclosing (Figure 3) a pulse modulator 204 with an analog

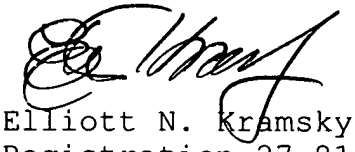
input 218 and a digital output 212. However, the digital output 212 is not applied to the resonator 208. Shaeffer teaches modulation of the digital output signal 212 of a sigma-delta modulator 204 with a further analog signal x(t) in a commuting modulator 206 (see Figure 2). The output signal 214 is not quantized. No quantized signal is input to the resonator as required by the language of claim 62 quoted above (in parentheses).

Further, Shaeffer describes a resonator filter (col. 2, lines 59 through 63, col. 4, lines 54 through 56). The resonator filter filters an electric input signal and outputs a filtered electric output signal (See Figures 2 and 5). Shaeffer clearly refers to an electromagnetic resonator (e.g. cavity resonator). In contrast, Claim 62 is limited to a micromechanical resonator. The ordinary meaning of "micromechanical resonator" is a micromechanical device having movable components capable of spatial oscillation. A micromechanical resonator may have either an electric signal input (actuator applications) or an electric signal output (sensor applications). In contrast, a "resonator filter" differs both in function and structure and offers a material contrast from the apparatus and method taught by new Claims 62 and 63.

None of the earlier-cited references discloses a micromechanical resonator driven by a quantized, pulsed signal nor does any logical combination thereof include or imply such teaching. None of the cited references refer to applications where such a micromechanical resonator is employed and, therefore, none could render it obvious to drive a micromechanical resonator by means of a quantized, pulsed signal.

For the foregoing reasons, all presently-pending claims define patentable subject matter. Prompt allowance and issuance of such claims are therefore earnestly solicited.

Respectfully submitted,



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